

## CLAIMS

What I, Colonel Lienal Sanders, Inventor, claim as my Invention is:

CLAIM 1- That with chemical coagulation, chemical flocculation, solids agglomeration and flocculation, and chemical precipitation and solids removal the inventor claims enhanced BOD, COD, TO, and COLOR removals across *Device A*; and further claims 75% to 95% electrical energy savings across *Device B at stream 3* as no aeration is necessary resulting in millions of dollars of savings to owners.

CLAIM 2- That with chemical coagulation, chemical flocculation, solids agglomeration and flocculation, and chemical precipitation and solids removal the inventor claims 95% reduction and removal efficiencies for all said four pollutants Biological Oxygen Demand, Chemical Oxygen Demand, Total Organic Carbon, and COLOR across *Device A at stream 2*.

CLAIM 3- That with the Old Art/ Old Fields of Invention the following pollutant parameters COD, TO, and COLOR go through the Old Biological Systems Unchanged; therefore there is Zero per cent reduction/ removals for these said three pollutants across all devices in Old Art/ Old Fields of Invention prior to discharge to stream whereas said new invention and New Technology- "Toxics ,Organic, Color Removal Technology Process /or Method For Toxicities, Organic, Color Reduction of All Pulp/Paper Mills' Wastewater" removes 95% for each of said four pollutants across *Device A at stream 2* alone.

CLAIM 4- That with the Old Art/ Old Fields of Invention Old Art /Biological Aeration Systems which includes aerated stabilization basins, lagoons, activated sludge, or any other devices where mechanical air or oxygen is inserted( *Device B*) that there is no biological degradation across *Device B and that only the negatively charged particles are changed from negative anions state somehow unknown with the aeration ,but the toxicities, organic loading is unchanged across the said aeration systems as the COD , TO, and COLOR constitute that no biodegradation, destruction has occurred comprising: Whereas* said new invention and New Technology Process /or Method fully protects the

public, aquatic life, human health and Loop-Holes in current Law have to be amended by U.S. EPA Administrator and all 50 states regulatory agencies by revising permits to include pollutant parameters COD, TO, and COLOR ; Old Art/Old Fields of Lime & other Color Removals were thought to be cost prohibitive as the premise was cost of chemicals at *Device A* plus the extended biological aeration was required; however this is a myth which is proven & revealed in said new invention and New Technology.

At stream #3, exiting Device B,

Pollutant Parameter:

Concentrations in Discharge Effluent ( in milligrams per liter ) [COLOR in mu.]

"Old Biological Technology" New Technology By Inventor Lienal Sanders {Note 1}

BOD5	60-90	40-60
COD	250-400	40-65
TO	150-300	40-65
COLOR	1000- 4000	100-250

Note1- With New Technology, the above concentrations for COD, TO, and COLOR also are same exiting Device A as proves no aeration is required. BOD, COD, TO concentrations are in milligrams per liter , and COLOR is in Platinum-Cobalt units of mu.

CLAIM 5- That with the Old Art/ Old Fields of Invention in that various Color Removals by addition of lime and other coagulants back in 70's , 80's and early 90's are still Old Art/Fields in that these Old Color Removals of Lime Treatment and all other Coagulant Color Removals were deficient from Inventor Lienal Sanders' said new invention and New Technology Process as they were and still are deficient as they assumed biological treatment through aeration systems was additionally required.

CLAIM 6- That said new invention and New Technology- "Toxics ,Organic, Color Removal Technology Process /or Method For Toxicities, Organic, Color Reduction of All Pulp/Paper Mills' Wastewater" contains a Regenerative Chemicals System as shown in *Device E* whereas approx 35% regeneration is achieved and recycled via stream 6 to the inlet of stream 1 which is inlet to *Device A*.

CLAIM 7- That the chemicals conveyed in *stream 6* are added automatically from *Device D* and may consist of any and/or combination of the following chemicals aluminum chloride [ AlC.sub.3] as this is commercial grade liquid solution approx 20 - 30%; , Commercial Alum which is liquid aluminum sulfate( 17 %commercial liquid solution ) [ Al .sub .2 (SO.sub.4).sub.3 ]; Ferric Chloride which is liquid solution [ FeCl.sub.3 ]; and Ferric Sulfate which is liquid solution [ Fe.sub.2 (SO.sub.4).sub.3 ]; Ferrous Sulfate which is liquid solution [ Fe.sub.3. (SO.sub.4).sub.3 ] comprising that the chemicals are added at influent at *stream 1* of said new invention and New Technology.

CLAIM 8- That with chemical coagulation, chemical flocculation, solids agglomeration and flocculation , and chemical precipitation and solids removal the inventor claims that this said New Technology Process/or Method becomes BACT ( Best Economically Achievable Technology) for Adsorbable Organic Halogens (AIX) and Dioxins.

CLAIM 9- That with chemical coagulation, chemical flocculation, solids agglomeration and flocculation , and chemical precipitation and solids removal the inventor claims an Automated Controller System as shown in *Device C* which will and does automatically control the optimum amount of all chemicals while measurement and accounting of chemicals from Regenerative Chemicals System as shown in *Device E*.

CLAIM 10- That with chemical coagulation, chemical flocculation, solids agglomeration and flocculation , and chemical precipitation and solids removal the inventor claims that the solids generated are non-hazardous, and that the approx 15-25% of solids are wasted (because of inert inorganic ash content) in the Sludge Conditioning /Wasting *Device M* as non-hazardous wastes shown in stream 15.

CLAIM 11- That with the Old Art/ Old Fields of Invention there were requirements for large Holding Ponds( lakes) *Device G* because of low flow, 7 Day Q 10 's , in the receiving streams ; *whereas* said new invention and New Technology Process fully eliminates any need nor requirement to construct 1,500,000,000 holding lakes /or larger as what occurred at the Boise Southern , DeRidder, Louisiana mill or Bowater's Catawba, S.C. mill and fully saves future mills from these huge capital investments and increases treatment plant capacity.

CLAIM 12- That with chemical coagulation, chemical flocculation, solids

agglomeration and flocculation , and chemical precipitation and solids removal the inventor claims automatic process analyzer *Device H* at the influent *stream 1* which will have alarm and will automatically alert operators of specific spills that require immediate corrective actions.

CLAIM 13- That said new invention and New Technology Process /or Method contains and **comprises the treatment of all pulp and paper mills' raw influent wastewater** as due to fact mills raw influent may range from 3 million gallons per day (MGD) to 70 MGD and mills capital investment sewer systems route all wastes to primary clarifier [ as shown in *Device A, stream 1* ] in *Figure 1* **this is only cost effective way; no segregation is required** and this was developed on pulping wastes, groundwood pulping, thermomechanical pulping, bleach plant wastes consisting of chlorine, hypochlorite, caustic extraction, lime kiln , recovery boilers, power boilers , utilities, paper machines as this integrated mill produced 1150 TPD ( tons per day) of kraft linerboard and 1070 TPD of newsprint ( 2 machines) with each newsprint machine rated at 535 TPD of newsprint.

CLAIM 14- That said precipitated solids have to be removed from system ( some Old Art/Old Fields re-dissolve precipitates at very low pH's with acids; however this is detrimental and a difference of New Invention) whereas underflow precipitated solids from clarifier *Device A* flow via stream 4 to the Regenerative Chemicals System as shown in *Device E* whereas existing dewatering equipment and said *Device E* are utilized to remove solids, but some flocculated coagulants are recycled via stream 6 to the inlet of stream 1 which is inlet to *Device A*.